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Sir:

Transmitted herewith for filing is the Patent Application of:

Inventors: Jason R. Baumgartner, Nadeem Malik, Steven L. Roberts
For: **Method and System of Audio File Searching**

Enclosed are:

X Patent Specification and Declaration

X sheets of drawing(s). (Informal) 5

X An assignment of the invention to International Business Machines Corporation (includes Recordation Form Cover Sheet).

____ A certified copy of a ____ application.

____ Information Disclosure Statement, PTO 1449 and copies of references.

The filing fee has been calculated as shown below:

For	Number Filed	Number Extra	Rate	Fee
Basic Fee				$690.00
Total Claims	21 - 20	1	x 18 =	$ 18.00
Indep. Claims	3 - 3	0	x 78 =	$ 0.00
MULTIPLE DEPENDENT CLAIM PRESENTED			x 260 =	$ 0.00
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X Any additional filing fees required under 37 CFR 1.16.

X Any patent application processing fees under 37 CFR 1.17.

Respectfully submitted,

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Method and System of Audio File Searching

BACKGROUND

51. Field of the Present Invention

The present invention generally relates to the field of digital electronic information, and more particularly to a method and system for searching audio files.

102. History of Related Art

Audio information is frequently distributed on a storage medium (referred to herein as a multimedia storage medium or audio storage medium) such as a compact disc (CD), digital video disc (DVD), audio tape, or VCR tape. On such media, audio information is typically arranged in a sequential fashion. Locating a particular portion of the audio information typically requires the user to advance (or reverse) through the media under manual control in an attempt to locate the precise location containing the desired information. Typically, however, the user's ability to rapidly locate a desired portion of the audio content is significantly limited. In an application where, for example, music is stored on a CD, the user is usually able only to advance to a pre-determined number of locations within the CD, namely, the beginning of each song on the CD. Within a particular song, the user may have the ability to advance the disc by a specified amount, but the audio output is typically disabled while the disc is advanced making it difficult to locate quickly a precise point in the song. Similarly, many consumers have had the experience of fast forwarding an audio tape or VCR to find a particular location in the tape. Typically, the user must respond reactively to media content that is flashing across a television screen or coming from a speaker at an unintelligible rate resulting in a back and forth search process that is time consuming, annoying, and potentially detrimental to the media player as its mechanism are rapidly altered from fast forward and reverse settings to a play setting.

SUMMARY OF THE INVENTION

The problems identified above are in large part addressed by a system for locating an audio segment within a storage device. The system relieves a user from the tedious fast-forward, reverse, and playback process typically employed to manually search for a desired location within a media. In addition, the automated searching process disclosed herein is capable of processing information much faster than is possible using manual searching techniques. A 40X CD-ROM device, for example, could search a CD for a given input sequence at a speed far greater than the greatest speed detectable with the human ear or eye. The system includes an input device suitable for transmitting an input sample that is indicative of the audio segment and a media player suitable for playing audio information stored on the storage device. The system further includes a sample converter configured to generate an input sample diphthong sequence in response to receiving the input sample from the input device. The input sample diphthong sequence may comprise a digital representation of the diphthong components of the input sample. An audio converter of the system is configured to generate an audio content diphthong sequence. The audio content diphthong sequence may comprise a digital representation of the diphthong components of the audio information on the storage device. The system may further include a comparator configured to detect a match between the input sample diphthong sequence and a portion of the audio content diphthong sequence. In one embodiment, the input device may be a keyboard and the input sample may be a text sample. In another embodiment, the input device may be a microphone and the input sample may be an audio message. In one embodiment, the comparator is further configured to produce a signal that indicates the location within the storage device of the matching portion of the audio content diphthong sequence. A media player may be configured to receive the location signal from the comparator and to advance the storage device to the location indicated by the location signal. The storage device may comprise a compact disc, a digital video disc, a VCR, an audio tape, or other storage device suitable for storing the input sequence.

The invention further contemplates a method of operating a multimedia or audio storage device player system in which an input sample is converted to a first sequence of diphthongs. An audio segment within a storage device is then located, where the diphthong components of the audio segment and the first sequence of diphthongs satisfy match criteria. The storage device may then be advanced to the location of matching audio segment. In one embodiment, converting the input sample to a first sequence comprises converting a text sample to its component diphthongs, while, in another embodiment, converting the input sample to the first sequence includes converting an audio sample to its component diphthongs. Locating the audio segment may include converting the audio content of the storage device to a second sequence of diphthongs and comparing the first and second sequences of diphthongs for a match.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the accompanying drawings in which:

FIG 1 is a block diagram of a system for locating a selected audio segment on a storage medium according to one embodiment of the present invention;

FIG 2 is a block diagram of a sample comparator of the system of FIG 1 according to one embodiment of the invention;

FIG 3 is a block diagram of a data processing system suitable for implementing the sample comparator of FIG 2;

FIG 4 is a flow diagram of a method of searching for an audio segment according to one embodiment of the invention; and

FIG 5 is a block diagram of a sample comparator according to one embodiment of the invention.

While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof are shown by way of example in the drawings and will herein be described in detail. It should be understood, however, that the drawings and detailed description presented herein are not intended to limit the invention to the particular embodiment disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE DRAWINGS

Turning now to the drawings, FIG 1 illustrates a system **100** for searching audio information to find an instance of a specified portion of audio content. In the depicted embodiment, system **100** includes an input device such as a microphone **102** or a keyboard **104** connected to a sample comparator **106**. The input device is suitable for transmitting an audio or text input sample to sample comparator **106**. Although the depicted embodiment indicates both a keyboard **104** and a microphone **102**, system **100** may be implemented with just a single input device. Sample comparator **106** communicates with a media player **108** that is suitable for playing the content of an audio or multi-media storage device **109** (referred to herein simply as storage device **109**) such as a compact disc (CD), digital video disc (DVD), VCR, or audio tape. Sample comparator **106** is preferably configured to deconstruct the text or audio input sample into a sequence of component pieces. The sequence is then used as the basis to search the content of a suitable storage device **109** for a matching sequence as defined by a specified set of match criteria. Upon detecting a match, one embodiment of system **100** is configured to advance storage device **109** to the matching entry in storage device **109**. In this manner, system **100**

enables a user to search automatically through a large audio file to find specified content and to set the media player at the location of storage device **109** containing the specified content.

Turning now to FIG 2 additional detail of sample comparator **106** according to one embodiment of the invention is presented. In the depicted embodiment, sample comparator **106** includes a sample converter **104** that is configured to receive specified audio content indicated by reference numeral **103** and referred to for purposes of this disclosure as an input sample. Input sample **103** may comprise audio content such as a portion of a spoken message or text content generated with a keyboard. In either embodiment, sample converter **104** is suitable for generating, from input sample **103**, a sequence of monosyllabic speech sounds referred to herein as diphthongs. Diphthongs are combined to form all of the words in a spoken language. The number of diphthongs required to form the vast majority of words used in spoken languages, such as English, is relatively small thereby enabling the creation of a very large number of words from a relatively small number of diphthongs. The sequence of diphthongs generated by sample converter **104** represents the input message **103**. In an embodiment in which input sample **103** comprises audio information received via microphone **102**, sample converter **104** utilizes any of a variety of speech recognition techniques to transform a spoken input sample **103** into its component diphthongs. Sample converter **104** may then assign a digital value to each of the diphthongs that form the spoken input sample **103** to form a sequence of digital values that are indicative of their corresponding diphthongs. The sequence of digital values generated by sample converter **104** is identified in FIG 2 by reference numeral **105** and referred to herein simply as diphthongs **105** or diphthong sequence **105**. Thus, sample converter **104** of sample comparator **106** is adapted to generate a diphthong sequence **105** that represents and is indicative of the audio content of the input sample **103**. In an embodiment in which input sample **103** comprises text information, sample converter **104** may generate diphthongs **105** based on an exact approach, using a diphthong database, or on a heuristic approach. These approaches are disclosed in a co-pending patent application of Baumgartner et al., entitled *Generating Multimedia Information from Text Information Using Customized Dictionaries*, which shares an

assignee with the present invention and is incorporated by reference herein. As indicated in FIG 2, the diphthong sequence **105** generated by sample converter **104** are forwarded to a string comparator **130**.

Turning momentarily to FIG 5, an embodiment of sample comparator **106** is depicted in which a digitized representation of input sample **103** is compared directly with the digitized representation of audio data **120** without extracting diphthong information as is done in the embodiment of sample comparator **106** depicted in FIG 2. Instead, a first digitizer **504** generates a digitized representation of the audio (or audio video) content of input sample **103**. This digitized representation (represented by reference numeral **505**), is received by a comparator **530**. Similarly, audio data **120** is digitized by a digitizer **522** (which may or may not comprise the same digitizer as digitizer **504**) to generate a digitized representation of audio data **120** as indicated by reference numeral **525**, which is also received by comparator **530**. Comparator **530** then compares digitized sample **505** with digitized data **525** to determine if a match exists between the two digitized data files. This embodiment may be suitably employed in an embodiment in which the input sample **103** comprises a "real" sample, such as a Beethoven concerto segment or other type of audio content that is not readily representable by a text or speech segment.

In one embodiment, comparator **530** includes hardware and software suitable for performing a fast Fourier transform (FFT) on digitized sample **505** and digitized data **525**. In this embodiment, comparator **530** further includes software suitable for performing a correlation function to check for a match in the frequency domain between digitized sample **505** and digitized data **525**. In one embodiment, segments or "windows" of audio data **520** are transformed to the frequency domain by the FFT capabilities of comparator **530** and then compared with a frequency domain representation of digitized sample **505** (also generated by comparator **530**). Each of these windows represents a time slice of audio data **120**. In one embodiment, each window corresponds to a time slice of audio data **120** that is comparable in

length to the length of input sample **103**, although the length of the window is preferably alterable by the user.

In one embodiment, overlapping windows are sampled to increase the probability of capturing the portion of audio data **120** that matches input sample **103** within a single window. For example, one embodiment might include time slice windows that have a length of T seconds, where T is approximately equal to the length of input sample **103**, and might sample audio data **120** every T/N seconds, where N is an integer greater than 0. If, as an example, input sample **103** is approximately 10 seconds long, the time slice window T might be 10 seconds as well. For N=2, ten second time slices would be sampled every T/N = 5 seconds. Thus, each ten second time slice would overlap its neighboring time slice by five seconds. Assuming that audio data **120** contains at least one match to input sample **103**, this implementation would guarantee that at least 75% of the matching segment of audio data **120** would lie within a single time slice. If greater accuracy is required, N can be increased. One embodiment, might include multiple iterations where the first iteration uses a relatively low value for N to identify windows of audio data **120** that might contain a match to input sample **103**. These identified windows of audio data **120** could then be sampled during a subsequent iteration using a higher value of to achieve greater accuracy.

Returning now to the embodiment depicted in FIG 2, sample comparator **106** further includes an audio converter **122** that is adapted to parse audio information from the storage device **109**. (The audio content of storage device **109** is identified as audio data **120** in FIG 2). Audio converter **122** may include an audio decoder capable of processing, as examples, MPEG or linear PCM encoded bit streams, wav files, etc. In addition, audio converter **122** may include an analog-to-digital converter enabling converter **122** to accept analog audio data from an audio tape or the audio track of a VCR. Audio converter **122** generates a sequence of diphthong information indicated by reference numeral **125** that is representative of the content of audio data

120. Like the input sample diphthong sequence **105**, the audio data diphthong sequence **125** may be comprised of a set or sequence of digital values, each corresponding to a particular diphthong.

In the depicted embodiment, input sample diphthong sequence **105** is received by a comparator **130**. Comparator **130** is adapted to search the audio data diphthong sequence **125** for a match with input sample diphthong sequence **105**. By converting input sample **103** and audio data **120** to a common format, namely, a diphthong format, comparator **130** may be implemented as a conventional string comparator that utilizes standard pattern matching algorithms. When a match is detected between input sample diphthong sequence **105** and a portion of audio data diphthong sequence **125**, the depicted embodiment of string comparator **130** generates a signal **132** that is received by media player **108**. The signal **132** preferably indicates the location within storage device **109** where the audio segment in audio data **120** that matches input sample **103** is found. In one embodiment, media player **108** responds to signal **132** by forwarding the multi-media storage device **109** to the location indicated by signal **132** such that media player **108** may immediately begin playing at the desired location.

In one embodiment, string comparator **130** may utilize match criteria that find and report the location of exact matches between input sample diphthong sequence **105** and audio data diphthong sequence **125**. In another embodiment, system **100** employs match criteria that permit the use of "fuzzy pattern matching" to desensitize system **100** to variations in speech-to-diphthong conversion technology and to allow the use of partial phrases. Fuzzy pattern matching algorithms are used in a variety of contexts including, as an example, "suggestion" generators for spelling checker applications. Additional information relative to fuzzy pattern matching algorithms is available in J. C. Bezdek & S. K. Pal (Ed.), *Fuzzy Models for Pattern Recognition: Methods That Search for Structures in Data* (IEEE; August 1992) ISBN: 0780304225, which is incorporated by reference herein. In one embodiment utilizing fuzzy pattern matching, the user is permitted to specify wildcards to further narrow down the search results. Imagine for example, a user is searching for an occurrence of the quote "all work

and no play makes Jack a dull boy." If the user recalls only that the phrase begins with "all work" and ends with "dull boy," one embodiment of the invention permits the placement of either a text or an audio wildcard between the phrase fragments "all work" and "dull boy" to narrow the search beyond the scope of searching either phrase fragment on its own. The wildcard may place additional restrictions on the search results such that, for example, all phrase fragments must be located within a specified number of diphthongs of one another. In another embodiment, not explicitly shown in the drawings, sample converter **104** and audio converter **122** may generate text files in lieu of diphthong sequences. In this embodiment, sample converter **104** and audio converter **122** may employ speech-to-text software suitable for creating the text files from audio input. Comparator **130** would then search the text file representing audio data **120** for a match with the text file representing the input sample **103**.

In one embodiment, a properly configured microprocessor-based computing device may be used to implement system **100**. Turning momentarily to FIG 3, selected components of such a computing device are indicated by reference numeral **200**. In the depicted embodiment, computing device **200** includes one or more processors **201** connected to a system memory **202** via a system bus **204**. Any of a variety of commercially distributed microprocessors may be used as processors **201** including, as examples, PowerPC® processors from IBM Corporation, Sparc® Microprocessors from Sun Microsystems, and x86 compatible microprocessors such as Pentium® processors from Intel Corporation and Athlon® processors from Advanced Micro Devices. Computing device **200** may further include one or more bridges **208** for providing communication between system bus **204** and a peripheral bus **206**. The one or more peripheral busses **206** may be compliant with industry standard peripheral busses including, as examples, the Industry Standard Architecture (ISA), the Extended Industry Standard Architecture (EISA), the Accelerated Graphics Port (AGP), and the Peripheral Component Interface (PCI) as specified in the PCI Local Bus Specification Rev. 2.2 available from the PCI Special Interest Group at www.pcisig.org and incorporated by reference herein. The depicted embodiment of computing device **200** further includes suitable input devices such as keyboard **210** and pointing device **212**

connected to peripheral bus **206** via an I/O adapter **214**. Computing device **200** may further include output devices including speaker **110** connected to peripheral bus **206** via audio adapter **216** and a display device **222** connected to peripheral bus **222** via a graphics adapter **218**. In one embodiment, computer device **200** may comprise a conventional desktop or laptop personal computer that is connected to media player **108** through an appropriate connection. In another embodiment, system **200** may comprise an embedded data processing system within media player **108**. Portions of system **100**, such as sample converter **104**, audio converter **122**, and string comparator **130**, may be implemented as a set of instructions stored on a computer readable medium such as system memory **202** of computer device **200**, a hard disk, floppy disk, CD ROM, magnetic tape, or other storage facility. In this implementation, the set of computer instructions are suitable for execution by processor(s) **201** of system **200** or by another suitable processor or controller.

Turning now to FIG 4, a flow diagram illustrating a method **140** of searching a storage device for specified audio content is depicted. The method **140** enables a user to quickly and automatically locate a desired point in a storage device containing audio content. The method improves on the cumbersome and time consuming method by which a user is typically required to advance through a multimedia storage device attempting to locate a specific passage or location. In the embodiment depicted in FIG 4, an input sample is initially detected in step **142**. The input sample, as discussed previously, may be an audio segment that is spoken by the user or a text segment that is typed or otherwise written by the user. Alternatively, the input may comprise an audio or audio-video sample stored on a storage media. As an example, the user may have a small audio or audio-video segment on an analog tape as the input sample. In this embodiment, the media player **108** depicted in FIG 1 may serve as the input device as well as the device used to transmit audio data **120** to audio converter **122**. In any event, the input sample indicates (in either an exact manner or in a "fuzzy" manner) the audio content of the storage device for which the user is searching. Upon detecting the input sample, an input sample diphthong sequence (the input sequence) is constructed in step **144** with a sample converter that

is configured to receive the input message in the form of a text file in the case of a typed input sample, a digitized representation of an audio message in the case of a spoken input sample, or both. In parallel with the construction of the input sequence, audio data from the multimedia storage device is processed or encoded in step **146** to produce an audio content diphthong sequence. The encoding of the audio data may occur either before, during, or after the construction of the input sequence in step **144**. The input sequence is then used (in conjunction with specified match criteria) to search (step **148**) the audio data diphthong sequence. If no match between the input sample diphthong sequence and the audio data diphthong sequence is detected in step **152**, a message indicating that no match occurred is generated in step **150**. If a match is detected, the depicted embodiment of method **140** includes a step **154** in which the user is prompted to indicate whether the matching is the entry that user was searching for (in case the multimedia storage device includes multiple occurrences of the storage information). If the user indicates that the matching entry is the correct entry, the multimedia storage device is advanced (step **156**) to the matched entry. If the user indicates that the matching entry is not the correct entry, the method returns to searching step **148** to find the next occurrence of the input sample in step **148**. In one embodiment, the production of the audio content diphthong sequence and the searching of the sequence occur in a "handshaking" fashion. In this embodiment, as diphthong sequences are generated in step **146** by the converter, they are forwarded to the comparator and searched in step **148**. If the comparator detects a match, it sends a command to the media player, such as an audio tape player, to stop and to rewind by the appropriate amount to the beginning of the matching segment. The rewinding can be handled by sending offset information to the comparator with each diphthong. When the comparator detects a match, the offset information can be re-sent to the media player to indicate the beginning location of the segment upon determining that the segment matches the input sequence. This handshaking embodiment beneficially requires less memory by eliminating the need to save the contents of the entire media device until the search process is initiated. In addition, by detecting matching diphthong sequences as they are generated, the media device will be at or near the physical location of the

matching sequence when it is detected thereby eliminating the need to rewind or fast-forward the media player by a significant amount.

It will be apparent to those skilled in the art having the benefit of this disclosure that the present invention contemplates a system and method for locating content within a multimedia or audio storage device. It is understood that the form of the invention shown and described in the detailed description and the drawings are to be taken merely as presently preferred examples. It is intended that the following claims be interpreted broadly to embrace all the variations of the preferred embodiments disclosed

WHAT IS CLAIMED IS:

1. A system for locating an audio segment within a storage device, comprising:

an input device suitable for transmitting an input sample indicative of the audio segment;

a media player suitable for playing audio content stored on the storage device;

a sample converter configured to generate an input sample diphthong sequence in response to receiving the input sample from the input device, wherein the input sample diphthong sequence comprises a digital representation of the diphthong components of the input sample;

an audio converter configured to generate an audio content diphthong sequence comprising a digital representation of the diphthong components of the audio content of the storage device; and

a comparator configured to detect a match between the input sample diphthong sequence and a portion of the audio content diphthong sequence.

2. The system of claim 1, wherein the input device comprises a keyboard and the input sample comprises text.

3. The system of claim 1, wherein the input device comprises a microphone and the input sample comprises an audio message.

4. The system of claim 1, wherein the input device comprises the media player and the input sample comprises information recorded on a storage media.

5. The system of claim 1, wherein the comparator is further configured to produce a signal indicative of the location within the storage device of the matching portion of the audio content diphthong sequence.

6. The system of claim 5, further comprising a media player configured to receive the location signal from the comparator and to advance the storage device to the location indicated by the location signal.

107. The system of claim 1, wherein the storage medium comprises a compact disc.

8. The system of claim 1, wherein the storage medium comprises a digital video disc.

9. A method of operating a multimedia storage device player system, comprising:

converting an audio input sample to a digitized representation of the input sample; and

locating a matching audio segment within audio data stored on a storage device, wherein a digitized representation of the audio segment and the digitized representation of the input sample satisfy match criteria.

10. The method of claim 9, further comprising, advancing the storage device to the location of matching audio segment.

2511. The method of claim 9, further comprising transforming the input sample to a frequency domain representation of the input sample and transforming a portion of the audio data to a frequency domain representation of the portion, wherein locating a matching segment includes

correlating the input sample frequency domain representation to the audio data frequency domain representation.

12. The method of claim 11, wherein transforming the input sample and the audio data segment comprises a Fourier transform.

13. The method of claim 9, wherein converting the input sample to its digitized representation comprises the sample to a first sequence of diphthongs and further wherein locating the audio segment includes converting the audio content of the storage device to a second sequence of diphthongs and comparing the first and second sequences of diphthongs for a match.

14. The method of claim 13, wherein converting the audio input sample comprises converting the audio input sample to a first text file, and further wherein locating the matching audio segment comprises converting the audio content on the storage device to a second text file.

15. A computer program product for locating an audio segment in a storage device, the computer program product comprising a computer readable medium configured with processor executable instructions, comprising:

first converter means for generating a first diphthong sequence responsive to receiving an input sample, wherein the first diphthong sequence is indicative of the input sample;

second converter means for generating a second diphthong sequence from audio information stored on the storage device; and

comparator means for locating a portion of the second diphthong sequence, wherein the located portion of the second diphthong sequence and the first diphthong sequence match according to a specified set of match criteria.

16. The computer program product of claim 15, wherein the input sample comprises a text sample.

517. The computer program product of claim 15, wherein the input sample comprises an audio sample.

18. The computer program product of claim 15, wherein the comparator means includes means for indicating the location within the storage device of the audio information corresponding to 10the second diphthong sequence.

19. The computer program product of claim 15, wherein the match criteria require exact match between the first and second diphthong sequence.

1520. The computer program product of claim 15, wherein the match criteria are fuzzy criteria.

21. The computer program product of claim 15, wherein the computer readable medium comprises a storage medium is one of a floppy diskette, hard disk, CD ROM, or magnetic tape.

Method and System of Audio File Searching

ABSTRACT

A system, method, and computer program product for locating an audio segment within a storage device are disclosed. The system includes an input device suitable for transmitting an input sample that is indicative of the audio segment and a media player suitable for playing audio information stored on the storage device. The system further includes a sample converter configured to generate a digitized representation of the input sample and a digitized representation of the audio information on the storage device. The digitized representation of the input sample may comprise a diphthong sequence indicative of the diphthong components of the input sample. In this embodiment, an audio converter of the system is configured to generate an audio content diphthong sequence. The audio content diphthong sequence may comprise a digital representation of the diphthong components of the audio information on the storage device. The system may further include a comparator configured to detect a match between the input sample diphthong sequence and a portion of the audio content diphthong sequence. In one embodiment, the input device may be a keyboard and the input sample may be a text sample. In another embodiment, the input device may be a microphone and the input sample may be an audio message. In one embodiment, the comparator is further configured to produce a signal that indicates the location within the storage device of the matching portion of the audio content diphthong sequence. A media player may be configured to receive the location signal from the comparator and to advance the storage device to the location indicated by the location signal. The storage device may comprise a compact disc, a digital video disc, a VCR, an audio tape, or other storage device suitable for storing the input sequence.

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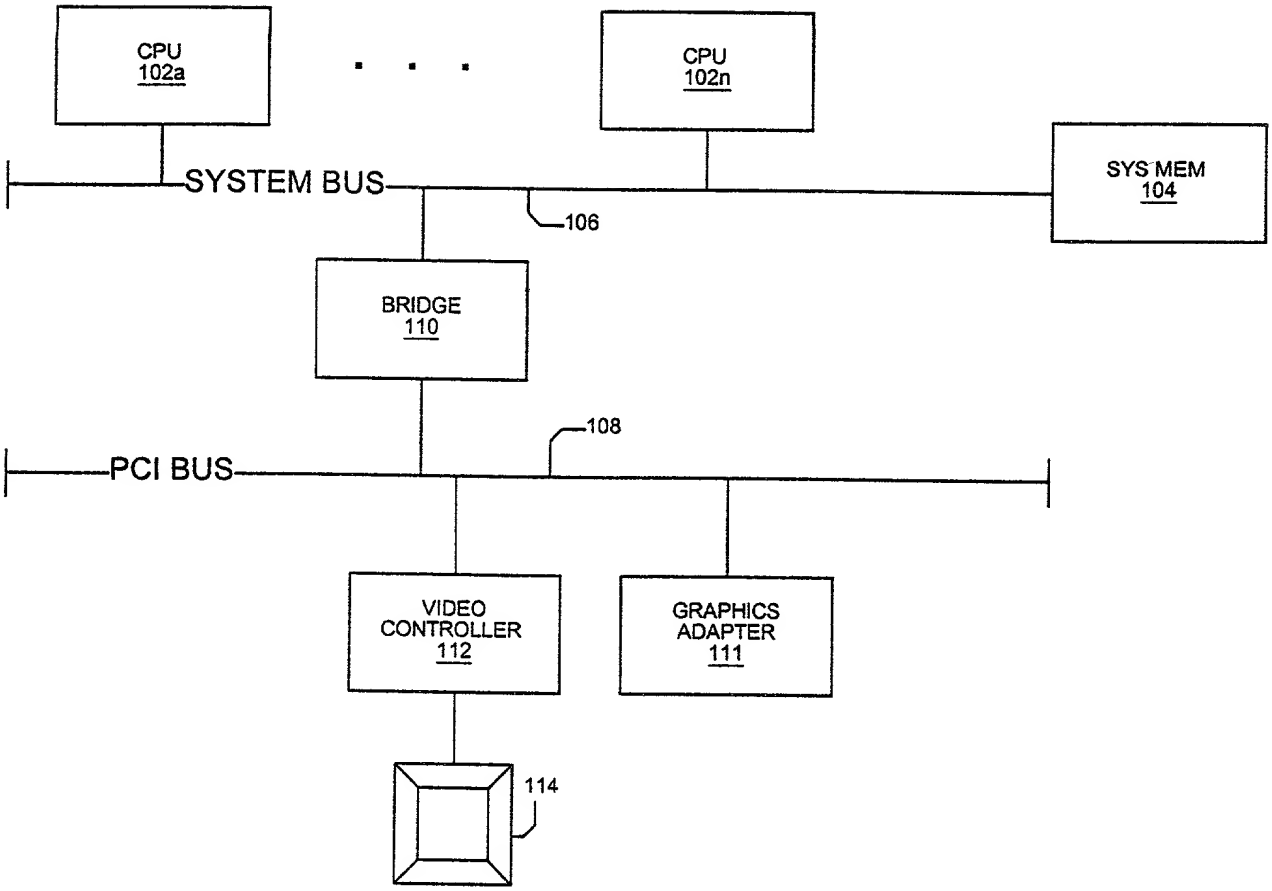

FIG 1

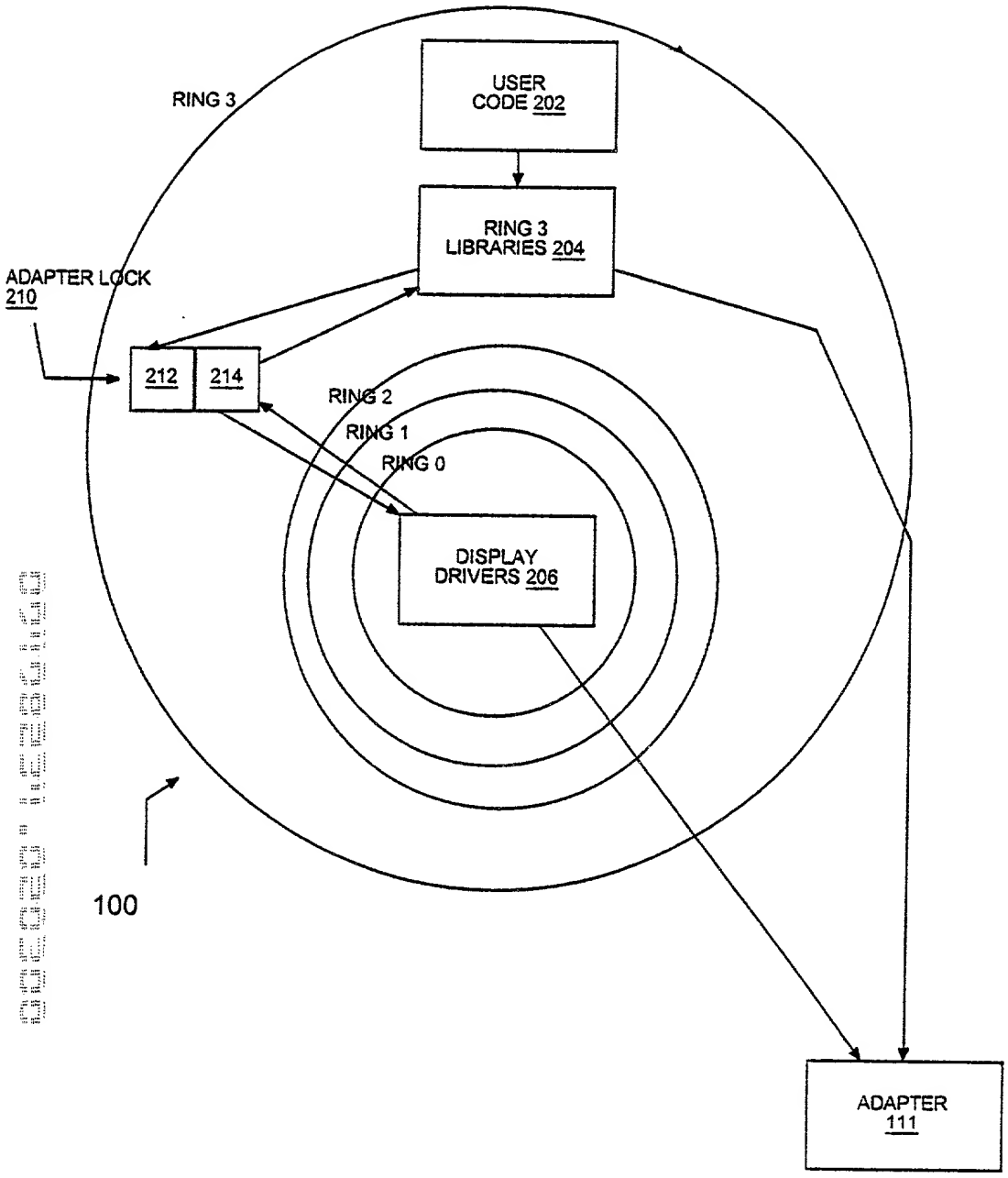

FIG 2

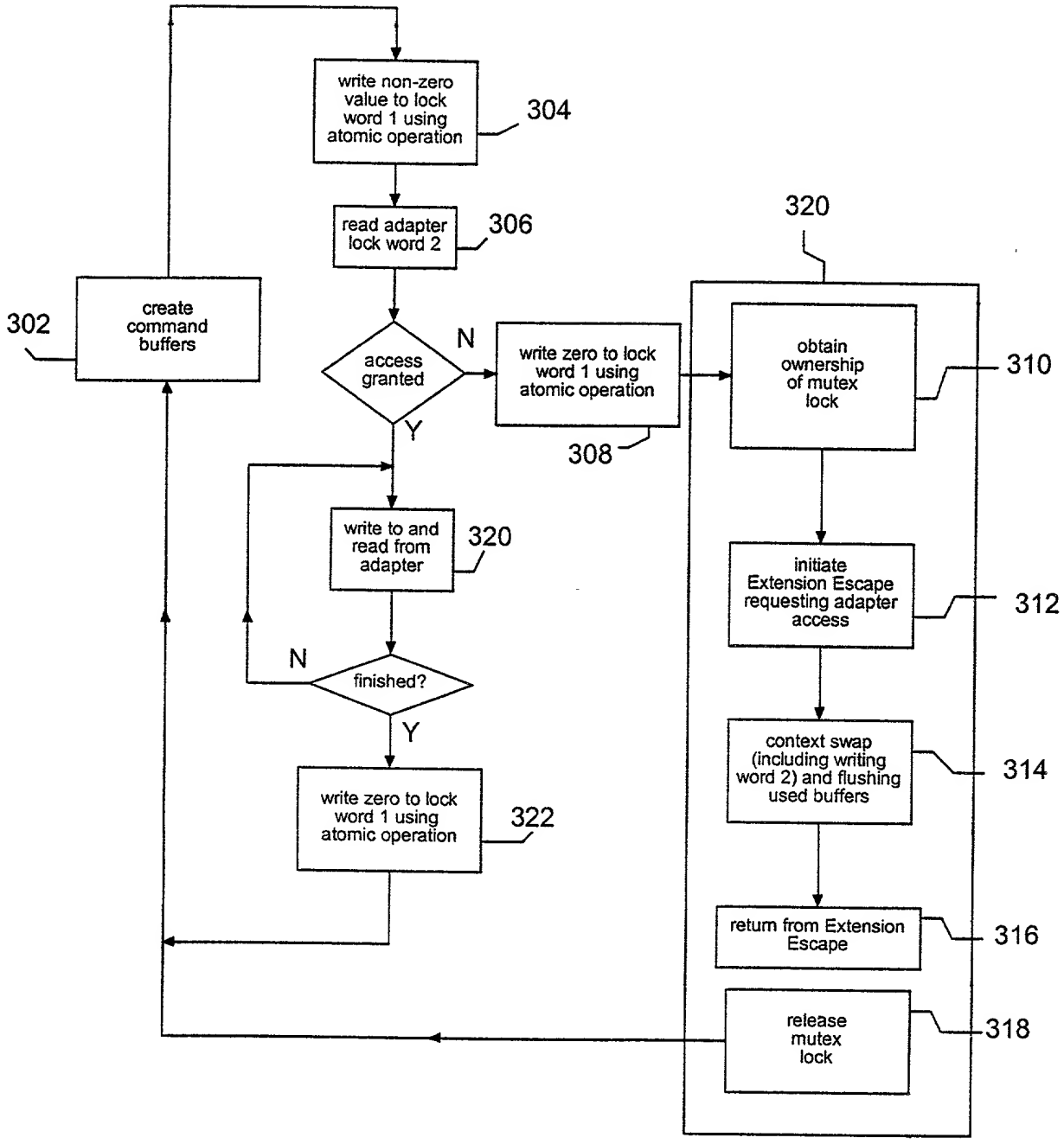
write non-zero value to lock word 1 using atomic operation
304
read adapter lock word 2
306
create command buffers
302
access granted
N
Y
write zero to lock word 1 using atomic operation
308
320
obtain ownership of mutex lock
310
initiate Extension Escape requesting adapter access
312
context swap (including writing word 2) and flushing used buffers
314
return from Extension Escape
316
release mutex lock
318
write to and read from adapter
320
N
finished?
Y
write zero to lock word 1 using atomic operation
322

FIG 3

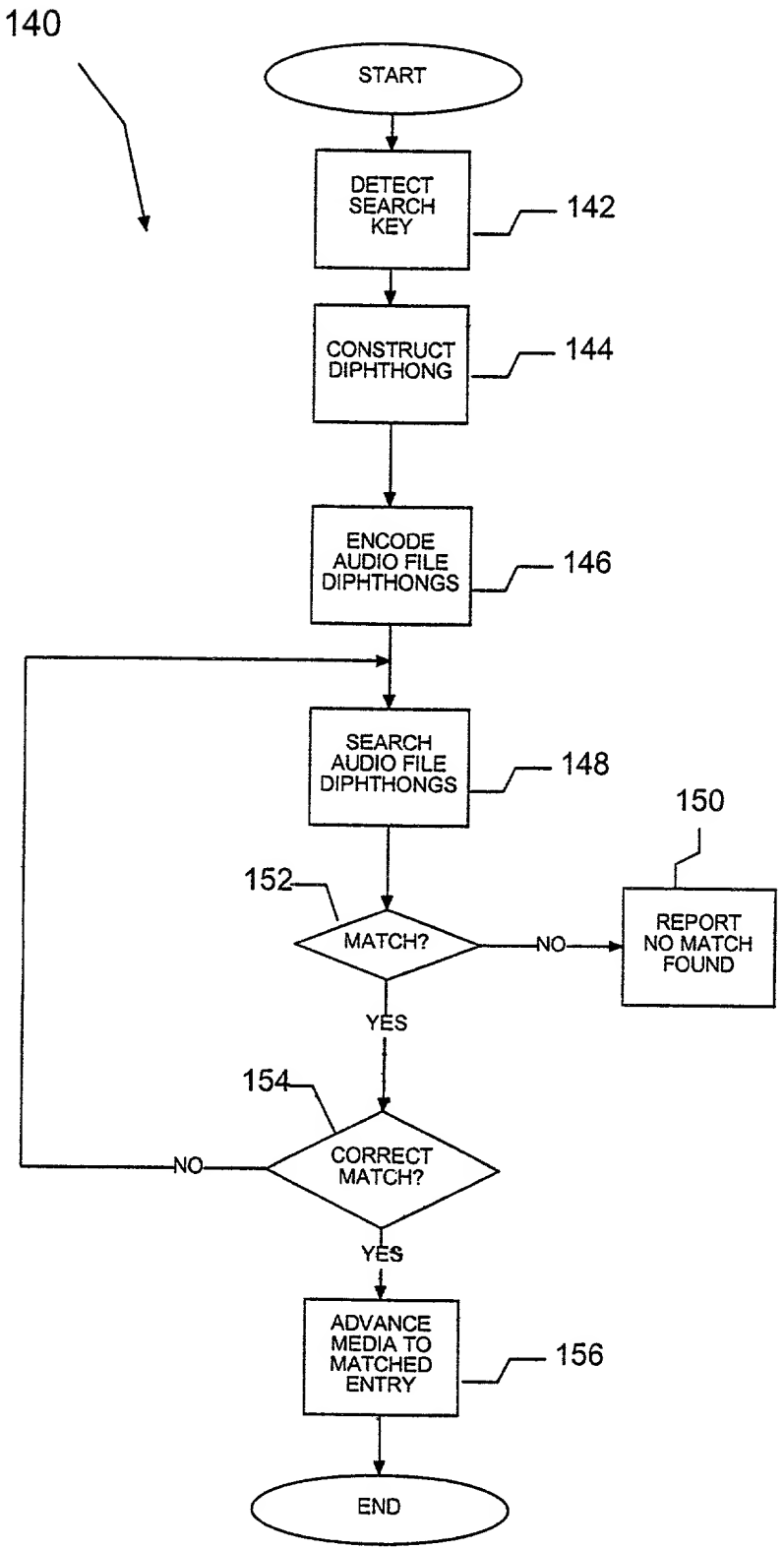

FIG 4

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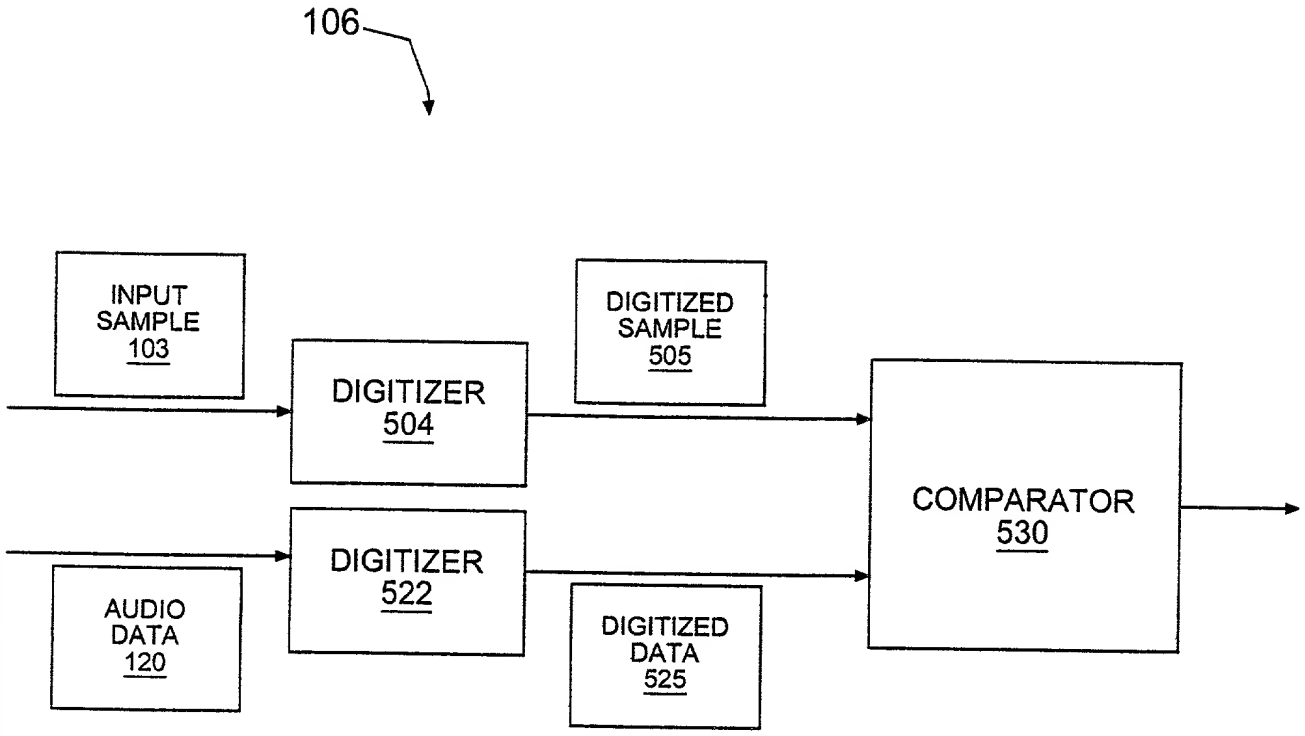

FIG 5

AUS990789US1

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **Method and System of Audio File Searching**.

the specification of which:

__X__ is attached hereto.
____ was filed on _____ as Application Serial No. _____
and was amended on _____.
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)			Priority Claimed
N/A			Yes/No
(Number)	(Country)	(Date Filed)	
N/A			Yes/No
(Number)	(Country)	(Date Filed)	

I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, 112, I acknowledge the duty to disclose information which is material to the patentability of this application as defined in Title 37, Code of Federal Regulations, 1.56, which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

N/A		
(Application Serial No.)	(Filing Date)	(Status)
N/A		
(Application Serial No.)	(Filing Date)	(Status)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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